

IDENTIFYING USAGE AND CHALLENGES OF CHIP APPLICATION FOR ASHA AND ANM IN PUBLIC HEALTHCARE DELIVERY SYSTEM

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in

Hospital and Health Management

By

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Under the Supervision and Guidance of

Dr Goutam Sadhu

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Internship cum dissertation completion certificate

Letter No : KB Admin/HR 2024-25/239

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This is to certify that Mr. Prateek Dad, a student of MBA in Hospital and Healthcare Management academic year 2022-2024 at IIHMR University, Jaipur has completed his internship with Khushi Baby from 15th march 2024 to 15th june 2024.

During the internship, Prateek did his dissertation on the topic of **"Identifying Usage and Challenges of CHIP Application for ASHA and ANM in Public Healthcare Delivery System"** under the project titled **"Community Health Integrated Platform"**.

Throughout the internship, he sincerely worked on all his assignments, and his overall performance was observed to be very good.

We wish him success in his future endeavors

Sincerely,

DocuSigned by:

Ajay Sharma

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled "Identifying Usage and Challenges of CHIP application for ASHA and ANM Application in Public Health Care Delivery System" in Udaipur district of Rajasthan is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



(Signature)

Name of Student: Prateek Dad

Date:

CERTIFICATE

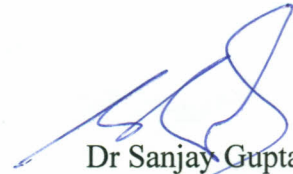
This is to certify that this dissertation titled "Identify Usage and Challenges of CHIP application for ASHA and ANM Application in Public Health Care Delivery System" is a record of research work undertaken by Mr. Prateek Dad in partial fulfilment of the requirements for the award of degree of MBA (Hospital and Health Management) from IIHMR University Jaipur under my guidance, supervision and his approach to the research study has been sincere, scientific, and analytical.



Dr Goutam Sadhu

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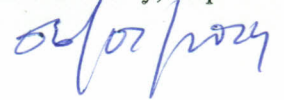
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Dr Sanjay Gupta

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Abstract

Title:- Identifying usage and challenges of CHIP application for ASHA and ANM in public healthcare delivery system.

Author Name:- Prateek Dad

Advisor Name:- Dr Goutam Sadhu

Keywords:- Impact of m-health solutions in public healthcare delivery system, User adoption of CHIP application, Challenges faced by ASHA and ANM while using CHIP application.

Background:- India's public healthcare delivery system depends on the crucial role played by ASHA and ANM. These frontline workers bridge the gap between communities and healthcare facilities. To enhance their effectiveness, the CHIP application was introduced. This report delves in to the usage and challenges associated with CHIP for ASHA and ANM workers, aiming to identify areas for improvement and optimize public healthcare delivery system in India.

Objective:-

1. To assess the usage of CHIP application in public health care delivery system by ASHA and ANM.
2. To identify the challenges which are faced by the ASHA and ANM while using CHIP application in public health care delivery system.
3. To analyze the effectiveness of the app and propose a strategy to make it user friendly.

Methodology:- A cross sectional small scale descriptive study was conducted at Lasadia(Tribal) and Vallabhnagar(Non-Tribal) block in Udaipur district of Rajasthan. The study was conducted for a duration of three months i.e. March to June 2024. The sample size for the study was selected as 20% of registered application user in a Lasadia and Vallabhnagar block i.e. ASHA=37 and ANM=11. The technique which was used for data collection is simple random sampling and we have considered that existing sample size was sufficient for fulfilling our objective of study.

Result:- In the study it was observed from an analysis that significant proportion of health workers was covered under age group of 31-40 years. Majority of health workers was qualified graduate or above and have a work experience of more than 10 years. The majority of health workers were using CHIP application whereas only six percent of health workers mentioned increasing workload and lack of time as denial reason for not using CHIP application. The majority of health workers was using CHIP application themselves. Additionally, the significant proportion of health worker entered data by first writing down it on paper then in application. The majority of health workers were not using CHIP application feature. RCH programme was the most convenient programme under CHIP application mentioned by majority of health worker. Majority of health worker have experienced application crash, Battery draining issue and Data syncing issue while interacting with CHIP application.

Conclusion:- The results suggested that the use of CHIP application was effective as majority of health workers were using CHIP application. The increasing workload on health worker was reduced by integration with existing application in public healthcare delivery system. Majority of the health workers have not used application features due to lack of awareness which indicates potential needs of further training. Majority of health workers have encountered application crash issue which can be addressed by optimizing user interface, avoiding unnecessary memory allocation and provide informative message to user for regularly update application. The battery draining issue can be addressed by enable power saving mode by default after login in an application and disable location feature once location was captured. The data syncing issue can be resolved by providing instruction to user that use data sync feature in an area where consistent internet connectivity was available.

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List of Abbreviations

S.no	Abbreviations	Full form
1	CHIP	Community Health Integrated Platform
2	ASHA	Accredited Social Health Activist
3	ANM	Auxiliary Nurse Midwives
4	NHM	National Health Mission
5	MoHFW	Ministry of Health and Family Welfare
6	NDHM	National Digital Health Mission
7	HW	Health Worker
8	NCD	Non-Communicable Disease
9	PCTS	Pregnancy and Child Tracking System
10	U-WIN	Universal Immunization Programme
11	FP-LMIS	Family Planning Logistic Management Information System
12	AB-HWC	Aayushman Bharat Health and Wellness Center

Chapter 1: Introduction

The arrival of digital technologies has brought a paradigm shift in public healthcare delivery system. In recent times, the introduction of digital application in public healthcare delivery system has surfaced a transformative approach, promising cost effective and quality-oriented healthcare services (1). The involvement of ASHA and ANM is paramount in public health initiatives due to their unique positions within communities. These frontline healthcare workers serve as trusted members who possess a profound understanding of local culture, language and healthcare needs. Acting as intermediaries between healthcare institutions, governmental bodies and the communities they serve. ASHA and ANM facilitates effective communication, education and advocacy for health related issues (2). Under NHM, India's public health system has biggest decentralized community health workforce in the country. MoHFW is making a significant transistion away from paper based monitoring techniques to realize NDHM, which will enhance the delivery of healthcare services. This endeavour will make it possible to track healthcare delivery in a way that is more accountable, effective and impactful (3).

ASHA workers are community health workers who provide basic healthcare services, promote preventive care and mobilize communities. ANM offers a wide range of services including antenatal care, immunization, delivery assistance in rural area (2). The traditional method of data collection and record keeping was often paper based which can lead to delay, inaccuracies, limited real time data for informed decision making. CHIP with its mobile application feature promises to streamline data collection, improve communication and enhance service delivery for ASHA and ANM (4,5). However the effectiveness of this application depends on its actual usage and experience of these frontline workers.

In response to growing demand for improved healthcare delivery, public health system are increasingly turning to digital health interventions. The rapid advancement of digital technologies has revolutionize healthcare practices, offering innovative solution to enhance the delivery of public healthcare services. One such platform is Khushi Baby, a

digital healthcare solution aimed at optimizing healthcare access and delivery in underserved communities.

Khushi Baby's solution includes team and technology for both health system strengthening and measurement of health system's impact. The CHIP is one stop solution to cover several public health indicators, enables community health workers(Digitally, Clinically, Financially), Health officials, Beneficiaries, and Public Health Researchers to understand local health disparities and respond with evidence-based public health intervention, with ongoing impact evaluations. CHIP application have emerged as a promising tool to enhance public healthcare services. The application holds the potential to revolutionize the way of healthcare worker functioning within public health system. This report delves into the usage and challenges associated with CHIP application for ASHA and ANM workers. The study explores the functionalities of CHIP application. It helps in examining how these functionalities streamline tasks, Improve data collection and ultimately enhance public healthcare services delivery at community level. It aims to provide valuable insights for policymakers and healthcare stakeholders.

ASHA Digital Health Application:- The ASHA digital health app is a mobile application specifically designed to support their pivotal part in delivering primary healthcare services. The app might includes modules for conducting Digital health survey, Registering pregnant women, Identifying high risk patients etc.

ANM Digital Health Application:- The ANM Digital health app is a mobile application for enhancing their healthcare delivery capabilities. It includes tools for Scheduling follow-up visit, Managing antenatal care and faciliating communication with medical officers for high risk cases.

Benefits of CHIP application:-

- 1) **Provide preventive and promotive healthcare services:** The CHIP application can facilitate activities like Maternal and child health monitoring, Immunization campaigns and early disease detection.

- 2) Improve data collection and reporting: The application facilitates streamline data collection on vital health indicators and enable data driven decision making.
- 3) Enhance communication and coordination: The CHIP application helps in improving communication between ASHA, ANM and MO leading to more efficient patient care.

Objectives of Study:-

1. To assess the usage of CHIP application in public healthcare delivery system by ASHA and ANM.
2. To identify the challenges which are faced by ASHA and ANM while using CHIP application.
3. To analyze the effectiveness of CHIP application and propose a strategy to make it user friendly.



Figure 1.1 Community Health Integrated Platform (CHIP)

Source:- www.khushibaby.org

Chapter 2: Review of Literature

S.no	Title	Author	Description
1	An Integrative Total Worker Health Framework for keeping Workers Safe and Healthy During Covid-19 Pandemic	Dennerlein J, Burke, Lisa, Sabbath, Williams J, Peters, Susan E, Wallace, Karapanos, Melissa, Sorenson, Glorian Year- 2020	Dennerlien et al discusses the integrative total worker health framework in the context of covid-19 pandemic. The pandemic has underscored the importance of ensuring the safety and health of healthcare workers. The author focusses on understanding the challenges in implementing digital health tools where remote healthcare delivery and management are increasingly relevant. The author proposes a six key TWH framework which help managers to systematically organize and protect essential workers during Covid-19 are Leadership commitment, Policies, programs and practices, supportive working conditions, stakeholder participation at every level of organization, Comprehensive and collaborative strategies, Ethical regulations, Commitment to data driven change and continuous improvement.
2	Public Health Digitalization in Europe	Odone A, Buttigieg, Ricciardi W, Azzopardi-Muscat, N & Staines A	The author discusses the digitalization of public health issues in Europe emphasizing the need for effective implementation of digital strategies in public health. The research insights

		Year- 2019	is valuable as it sheds light on the broader context of digital transformation in public health system providing insights in to potential challenges associated with the implementation of digital health tools. The national and regional authorities should be equipped with technical infrastructure to support the implementation of digital solutions. The target populations and economic investment are necessary for successful implementation of digital health solutions. The public health workforce needs to be trained at regular interval. The digital technologies can support personalized and precise interventions, improving health outcomes as well as patient care. It helps in streamlining the process of report generation. The predictive analysis can help identify high risk population and prevent disease. Data analytics can provide insights into health trends and behavior, informing public health policy and interventions. The implementation of digital application leads to improve public health outcomes and empowerment of health workers.
3	Grand challenges in digital health frontiers in public health	Kostkova Year- 2015	This article highlights the need for clear regulatory frameworks that govern the development, deployment and use of digital health technologies. The author emphasizes the importance

			of developing a skilled workforce that can effectively integrate digital health solutions into healthcare systems. The author emphasizes the grand challenges in digital health, including the implementation and integration of digital technologies in public health system. It also helps in understanding the challenges associated with the adoption of digital health tools such as ASHA and ANM application within public healthcare delivery system. The article emphasizes the need for seamless data integration and interoperability across different healthcare system. The author stresses the importance of robust security measures to protect patient data and ensure privacy. The digital health solutions must be designed to be accessible and user friendly for patients with varying level of technical proficiency.
4	An opportunity for diagonal development in global surgery: Cleft lip and palate care in limited resource setting.	Patel, Pratik B, Hoyler, Marguerite M, Maine, Hughes, Christopher D, Hagander, Meara J Year- 2012	The author highlight that CLP is one of the most common congenital anomalies globally, affecting over 200,000 newborns annually with majority occurring in LMICs. Patel et al highlight the concept of diagonal development in global surgery, focusing on cleft lip and palate care in limited resource settings.

5	The rise and fall of England's National Programme for IT	Robertson A, Bates DW, Sheikh A Year- 2011	This article explores national programme for IT in England, a large-scale initiative for implementing electronic health record across national health service. The author discusses programme initial goal, challenges faced and eventual shift towards decentralized approach. Robertson et al (2011) offer insight in to rise and fall of England national programme for IT, highlighting the complexities and challenges of large-scale IT initiatives in healthcare. This is relevant for understanding the potential barriers to the effective implementation of digital health tools in public healthcare delivery system.
6	Addressing comprehensive primary healthcare in Gujarat through m Health intervention with TECHO+ program	Somen Saha, Priya Kotwani, Apurva Kumar Pandya, Chintan Patel, Komal Shah, Deepak Saxena, Tapasvi Puwar, Shreya Desai, Dashrath M Patel, A.V. Sethuraman, Jayanti S Ravi.	This article explores about implementation of m health intervention aimed at addressing comprehensive primary healthcare in Gujarat, India. The TECHO+ program was launched to provide comprehensive primary healthcare services in Gujarat by mobile technology. It focusses on preventive, promotive, curative, rehabilitative and palliative aspects of care. The program utilizes existing sub centre and primary health center by transform them in to

		Year- 2010	Ayushman Bharat Health and wellness Centre for providing 12 range of services to the beneficiary. The objective of study was to document and rollout early implementation experience of TECHO+ program in Gujarat.
7	An empirical study on performance monitoring and online payment system of ASHA.	Shivangani Rathore, Dr Mahima Rai Year- 2009	This article explores details about performance monitoring mechanism of ASHA through online payment system. The ASHA are community health workers appointed under National rural health mission to provide healthcare service at grassroot level. The key objective is to develop transparent and timely payment system for ASHA, Monitor the performance of ASHA, Avoid human interference and build a friendly work relationship between ASHA and government health officials
8	Assessment of ASHA knowledge about health problems and services provider by her to people of district Ludhiana (Punjab)	Ravinder Kaur, Hoshiar Chauhan, Nand Lal Gupta, Pratap Thakur, Sandip Pihari Year- 2009	This article explores about the crucial role of ASHA in India's public health program as we know that ASHA are community health workers appointed under National rural health mission to provide healthcare service at grassroot level. The study aims to assess the knowledge of ASHA about common health problems and the service they provide to community. The study aims to highlight the importance of continuous capacity building and support for ASHA to ensure

			effective implementation of public health program at grass root level.
9	Challenges and prospects in India's Digital Health Journey	Nachiket Gudi, Theophilus lakiang, Sanjay Pattanshetty, Suptendra Nath Sarbhadrhikari, Oomen John Year-2009	This article explores about the challenges encountered during India's digital health journey. The study suggested several challenges like: low digital literacy among health workers especially old frontline workers in the adoption and effective use of digital health technologies, shortage of skilled workforce in health informatics which is crucial for developing and maintaining digital health infrastructure, lack of robust data governance framework and policies which led to concern about patient data privacy and security.
10	Five crucial challenges in Digital Health	Nicholas Cummins, Bjorn W Schuller Year- 2009	This article explores about five crucial challenges in digital health was data security and privacy by ensuring robust security mechanism for maintaining the privacy of sensitive patient data especially in healthcare organization. The lack of interoperability between different healthcare system poses a significant challenges for digital health that hinder effective communication between system. The transparent regulatory framework needed to ensure the safety and cost effectiveness of digital health application.

Chapter 3: Methodology

- a) **Research Question:-** What are the usage and challenges of CHIP application for ASHA and ANM in Public healthcare delivery system?
- b) **Study Design:-** A cross sectional small scale descriptive study was conducted in which there is no comparison group was considered while conducting present study.
- c) **Study Setting:-** The respective study was conducted at Lasadia and Vallabh Nagar block in Udaipur district of Rajasthan.
- d) **Study Population:-** Health care workers such as ASHA and ANM.
- e) **Inclusion Criteria:-** Those health workers who voluntarily agreed to the terms and condition of informed consent form was included in the study otherwise excluded from the study.
- f) **Study Tool:-** Questionnaire was used as a data collection tool through google form.
- g) **Mode of Interview:-** Telephonic interview
- h) **Duration of Study:-** The study was conducted for a period of three months i.e. March to June 2024.
- i) **Sampling Technique:-** Simple random sampling was used for selection of sample for study.
- j) **Sample size:-** 20% of registered application users in a Lasadia and Vallabh Nagar block i.e. ASHA=37 and ANM=11 we have considered that existing sample size was sufficient for fulfilling our objective of study.
- k) **Data analysis plan:** The data is edited, coded, tabulated, organized according to the requirement of study. The collected data was analyzed SPSS software. Data obtained from healthcare worker was filled in checklist will be coded as per the requirement.
- l) **Ethical considerations:**
 - 1. Protect the right of Research Participant.
 - 2. Enhance Research Validity.
 - 3. Maintain Scientific or Academic Integrity.
 - 4. Maintain Confidentiality.

5. Informed consent.

6. Misleading Information and Representation of primary data finding in a biased way must be avoided.

Chapter-4 Result

In the study healthcare workers was interviewed to obtain information regarding sociodemographic profile like- age, education and work experience of healthcare workers.

Table 4.1:- Socio Demographic Profile of Healthcare Workers (n=48)

Variable	Frequency(n=48)	Percentage(%)
Designation of HW		
ASHA	37	77
ANM	11	23
Types of Blocks		
Lasadia	25	52
Vallabh Nagar	23	48
Age of HW		
18-30	12	25
31-40	20	42
41-50	14	29
51 or more	2	4
Qualification of HW		
<= 8 th pass	5	10
10 th pass	13	27
12 th pass	11	23
Graduate or more	19	40
Work experience of HW		
< 1 year	3	6
1-2 years	4	8
2-5 years	6	13
5-10 years	5	10
> 10 years	30	63

The analysis was carried out to find socio demographic profile of health workers and the results were being presented in table 4.1

The analysis suggested that [77 percent] of the respondents were ASHA and [23 percent] were ANM. The analysis showed that [52 percent] of the respondents were from tribal block whereas [48 percent] were from non-tribal block. It was observed from

the analysis that [42 percent] of the respondents were covered under age group of 31-40 years whereas four percent of the respondents were covered under age group of 51 or more years. Further it was observed from the analysis that [40 percent] of respondents were graduate or above whereas [10 percent] of respondents was found to be studied up to 8th standard. Additionally, [63 percent] of respondents having work experience of more than 10 years whereas six percent of respondents having work experience up to one year.

Table 4.2:- Exhibits details about different types of applications currently used by Healthcare workers (n=48).

Types of application	Frequency(n=48)	Percentage(%)
CHIP		
Users	45	94
Non-users	3	6
PCTS		
Users	43	90
Non-users	5	10
U-WIN		
Users	17	65
Non-users	31	35
NCD		
Users	30	63
Non-users	18	37
FP-LMIS		
Users	16	33
Non-users	32	67
AB-HWC		
Users	32	67
Non-users	16	33
NIKSHAY		
Users	1	2
Non-users	47	98

The analysis was carried out to obtain information regarding different types of applications currently used by healthcare workers and the results were being presented in table 4.2

The analysis reveals that majority of the healthcare workers was using CHIP application whereas only two percent of the healthcare workers was using NIKSHAY application. Additionally, six percent of the respondents mentioned the denial reason of not using CHIP application was lack of time and increasing workload due to usage of multiple applications and same data entry were being made at a given point of time.

Table 4.3:- Exhibit information about reason of not using CHIP application

Reason	Frequency(n=3)	Percentage (%)
Increase workload Selected	2	67
Lack of time Selected	1	33

The analysis was carried out to obtain information regarding the reason of not using CHIP application and the result were being presented in table 4.3

The analysis suggested that majority [67 percent] of health workers have mentioned increase workload as a denial reason for not using CHIP application due to usage of multiple applications at the same time and same data entry should be made by health worker at a given point of time.

Table 4.4:- Exhibit information about CHIP application usage and number of trainings provided to healthcare workers

Variables	Frequency(n=48)	Percentage(%)
Last time CHIP application used by HW		
Within 7 days	16	33
15 days ago	7	15
One month ago	5	10

>1 month ago	20	42
Number of training provided to HW		
1 training	27	57
2 training	15	31
3 training	5	10
>3 training	1	2
User of CHIP application		
Used by HW only	36	75
Mostly used by family member	4	8
Sometime used by HW and sometime used by family member	8	17
Data entered by HW		
First on paper then on application	35	73
Directly in application	13	27
Features of CHIP application		
User	13	27
Non-user	35	73
Application tutorial video		
Once in a week	5	10
Fortnightly	4	8
Once in a month	5	10
More than a month	26	55
Never	8	17

The analysis was carried out to obtain information about CHIP application usage and number of training provided to health workers and the result were being presented in table 4.4

The analysis reveals that a significant number of health workers [42 percent] have not used CHIP application over a month whereas only [33 percent] of health workers have used CHIP application within 7 days. In addition to this it was observed from the analysis that more than fifty percent of health workers [57 percent] received only one training while two percent of health workers received more than three training before implementing CHIP application. Additionally, it was observed from analysis that three-

fourth of health workers [75 percent] used CHIP application themselves while eight percent of health workers mostly rely on family members for using CHIP application. Further it was observed from an analysis that almost equal to three-fourth of health workers [73 percent] entered data by first writing it down on paper then in an application whereas [27 percent] of health worker directly entered data in an application. Additionally, it was observed from an analysis that [73 percent] of health workers have not used features like- Aadhar scanner, OCR scanner provided under CHIP application. In addition to this, majority [55 percent] of health workers have watched application tutorial video over a month whereas only eight percent of health workers have watched application tutorial video within fifteen days. The application tutorial video was used as a reference material while interacting with CHIP applications.

Table 4.5:- Most convenient programme under CHIP application

Name of Programme	Frequency(n=48)	Percentage(%)
Add household		
Convenient	19	40
Non-convenient	29	60
Family register		
Convenient	12	25
Non-convenient	36	75
Family planning		
Convenient	7	15
Non-convenient	41	85
RCH programme		
Convenient	36	75
Non-convenient	12	25
NCD programme		
Convenient	1	2
Non-convenient	47	98
Other national programme		
Convenient	4	8
Non-convenient	44	92
Screening and follow up		

Convenient	1	2
Non-convenient	47	98
ABHA number		
Convenient	2	4
Non-convenient	46	96

The analysis was carried out to gain information about most convenient programmes under CHIP application and the results were being presented in table 4.5

The analysis suggested that three-fourth of health workers [75 percent] considered RCH programme was most convenient programme under CHIP application whereas majority of health workers [more than 90 percent] considered NCD, Other national programmes, Screening and follow-up and ABHA number as non-convenient programmes under CHIP application.

Table 4.6:- Challenges encountered by health workers under CHIP application

Types of Challenges	Frequency(n=48)	Percentage(%)
Application crash or freeze		
Met	31	65
Unmet	17	35
Data syncing issues		
Met	31	65
Unmet	17	35
Battery draining issues		
Met	22	46
Unmet	26	54
No issues		
Met	5	10
Unmet	43	90

The analysis was carried out to acquire information regarding challenges encountered by health workers while operating CHIP applications and the results were presented in table 4.6

The analysis showed that [65 percent] of health workers have encountered applications crash and data syncing issue whereas only [10 percent] of health workers have not experienced any challenges while operating CHIP application.

Table 4.7:- Health workers contact for guidance while interacting with CHIP application (n=48).

Contact person	Frequency (n=48)	Percentage (%)
Supervisor		
Selected	24	50
Not selected	24	50
Helpline number		
Selected	39	81
Not selected	9	19
Family member		
Selected	12	25
Not selected	36	75
Co worker		
Selected	4	8
Not selected	44	92

The analysis was carried out to acquire information about contact person when health workers have experienced any problems while interacting with CHIP application and the results were being presented in table 4.7

The analysis reveals that majority [81 percent] of health workers have contact helpline number when experienced any challenges while interacting with CHIP application whereas eight percent of health worker have established contact with co- worker when encountered any challenges while interacting with CHIP application.

Table 4.8:- Exhibit information about whether ANM was able to visualize the data entered by ASHA

Variable	Frequency(n=11)	Percentage(%)
ANM was able to visualize the data entered by ASHA		
Yes	11	100
No	0	0

The analysis was carried out to obtain information about whether ANM was able to visualize or supervise the data entered by ASHA and the results were being presented in table 4.8

The analysis reveals that [100 percent] of ANM was able to visualize or supervise the data entered by ASHA which means that ANM was able to continuously or closely monitor the data entered by ASHA.

Table 4.9:- Association between Age of respondents and CHIP application usage (n=48).

CHIP application	Age of Health worker			
	18-30 years	31-40 years	41-50 years	51 or more
Selected				
Number	10	15	18	2
Percentage (%)	83	100	95	100
Not selected				
Number	2	0	1	0
Percentage (%)	17	0	5	0
Total Count	12	15	19	2

Chi-Square Test result

	Value	df	Asymptotic Significance (2 sided)
Pearson Chi-Square	10.042 ^a	3	.018
Likelihood Ratio	9.813	3	.020
Linear by Linear Association	4.562	1	.033
N of Valid Cases	48		

The analysis was carried out to check the association between Age of respondents and CHIP application usage chi- square test was performed and the results were presented in table 4.9

The analysis suggested that the age of health workers has statistically significant association with CHIP application usage. Additionally, the analysis showed a positive correlation between age of health workers and CHIP application usage.

Table 4.10:- Association between Qualification of respondents and CHIP application usage (n=48).

CHIP application	Qualification of Health worker			
	<=8 th Pass	10 th Pass	12 th Pass	Graduate or more
Selected				
Number	5	10	13	17
Percentage (%)	100	100	93	89
Not selected				
Number	0	0	1	2
Percentage (%)	0	0	7	11
Total Count	5	10	14	19

Chi-Square Test result

	Value	df	Asymptotic significance (2 sided)
Pearson Chi-Square	9.483 ^a	3	.024
Likelihood Ratio	11.041	3	.012
Linear by Linear Association	7.393	1	.007
N of Valid cases	48		

The analysis was carried out to check the association between qualification of respondents and CHIP application usage chi- square test was performed and the results were presented in table 4.10

The analysis suggested that the qualification of health workers has statistically significant association with CHIP application usage. In addition to this, the analysis showed a positive correlation between qualification of health workers and CHIP application usage.

Table 4.11 Association between work experience of respondents and CHIP application usage (n=48).

CHIP application	Work experience of HW				
	< 1 year	1-2 years	2-5 years	5-10 years	>10 years
Selected	3	2	5	5	30
Number	100	50	83	100	100
Percentage (%)					
Not selected	0	2	1	0	0
Number	0	50	17	0	0
Percentage (%)					
Total Count	3	4	6	5	30

Chi-Square Test result

	Value	df	Asymptotic significance (2 sided)
Pearson Chi-Square	16.711 ^a	4	.002
Likelihood ratio	11.492	4	.022
Linear by Linear association	6.336	1	.012
N of Valid cases	48		

The analysis was carried out to check the association between work experience of respondents and CHIP application usage chi- square test was performed and the results were presented in table 4.11

The analysis suggested that the work experience of health workers has statistically significant association with CHIP application usage. Additionally, the analysis showed a positive correlation between work experience of health worker and CHIP application usage.

Chapter 5:- Discussion

The findings of Grand challenges of Digital health (4) highlight several challenges and opportunities in the field of digital health by ensuring digital health solutions was accessible to underserved community. The findings focused on emphasizing user-friendly design by considering the needs of end users such as healthcare workers. The study shows the importance of interoperability by developing that kind of digital health tools which can seamlessly integrate with existing health information system and data infrastructure. The study focused on developing scalable solutions by ensuring long term financial sustainability. The findings helped in improving public health outcomes through robust monitoring and evaluation mechanism. While findings of our study has completely aligned with above study findings as it reveal a complete overview of the challenges in the field of digital health by focusing on user centered design which fulfills the needs of healthcare workers and streamlining the reporting system and leads to optimum utilization of public health resources. Our findings focused on developing digital health solutions which were accessible to underserved communities by increased access to healthcare services. The findings from our study highlight the need to develop a scalable solution. The findings from our study focused on evidence-based approach for improving public health outcomes and health seeking behavior of health workers. The findings highlight the need of capacity building through training conducted at regular interval for effective and efficient healthcare service delivery in public healthcare delivery system.

The findings of Public health digitalization in Europe (1) suggested that the digitalization provides several potential benefits for public health including support for the transition from cure to prevention by making healthcare system more efficient, safer and cheaper by implementing European strategy in the form of political commitment, normative frameworks, technical infrastructure, economic investment, research, monitoring and evaluation but at the same time it increases workload on health worker due to usage of different application at a given point of time and health worker was required to enter same data in a multiple application. The findings of our study have aligned with the above study as it provides a comprehensive overview of different types

of applications currently used by health care workers. In our study the healthcare worker use different applications like: - CHIP application, PCTS application, U-WIN application, NCD application, FP-LMIS application, AB-HWC application. This data was used to analyze various aspects of technology adoption and its implications in healthcare service delivery. Most healthcare workers was using CHIP applications which suggest that CHIP application was widely accepted tool among healthcare workers for effective and efficient healthcare service delivery in public health care delivery systems. The burden on healthcare workers can be reduced by integrating with existing applications of health systems.

The findings of an integrative total worker health framework for keeping workers safe and healthy during Covid-19 (2) disclose the importance of digital health solutions for effective and efficient healthcare service delivery as it provides detailed overview of digital application like: Co-Win for tracking covid suspected cases in nearby areas or vicinity and also helped in booking vaccination slots. The training modules were implemented for the safety and security of patients as well as healthcare workers. It helped in continuous monitoring of healthcare workers. In this study based on findings shows that the paper-based record was completely replaced by digital records. The awareness level of healthcare worker was found to be increased due to rapid use of digital application tools during Covid-19 whereas the findings of our study has clashed with above study as it provide detailed information about the usage of CHIP application by healthcare workers and number of trainings provided to them. The finding shows that majority of health care workers have not used CHIP application over a month. The varied frequency of CHIP application usage among healthcare workers suggested that there was a factor which influence utilization of CHIP application like:- Increasing workload and Lack of time due to usage of multiple applications at a given point of time. The limited number of training impacts effective utilization of CHIP application. This data was used to highlight the need for more comprehensive and ongoing training for effective usage of CHIP application. In addition to this, most of health care workers were using CHIP application themselves while only eight percent of health workers rely on family members for operating CHIP application. Additionally, it was observed from analysis that health workers have practice of first recording data on paper then entered

in CHIP application which would reduce the risk of data entry errors. Further it was observed from analysis that majority of health workers were not using CHIP application features due to lack of awareness among health workers for using these features while operating CHIP application.

The findings of an opportunity for diagonal development in global surgery (5) suggested that the study focus on a specific disease through vertical care delivery model which operate parallel with the local healthcare system it may not lead to increase overall surgical capacity. This issue was resolved with the help of diagonal model by Investing in local surgical infrastructure, equipment and supplies or through training of local surgical workforce by establishing self-sustaining revenue streams in global community. The diagonal development refers to approach that focusses on building sustainable, integrated and interdisciplinary surgical care system rather than providing short term surgical intervention. The findings exhibits advantages of diagonal approach was continuity of care it means that the approach focusses on long term care. The approach focused on patient driven selection and monitoring long term outcomes. This approach focusses on local workforce development through robust training which leads to develop self-sustained revenue streams and increases return on investment. The findings of our study has clashed with above study as it provides a detailed overview of all the programmes covered under National health mission out of which most convenient programmes under CHIP application was RCH programme was most convenient programme under CHIP application. The result highlighted the need to prioritize user experience and streamline processes to improve the effectiveness of CHIP applications.

The findings of Robertson A et al (3) suggested the use of electronic patient record in various digital healthcare system. The study shows various reasons of failure on implementing national health service due to application crash issues, data syncing issues, centralized design, implementation issues. The findings highlighted the challenges of large-scale centralized IT projects in public sector and emphasizing the need of better stakeholder engagement for effective and efficient implementation of electronic patient records. The findings of our study have completely aligned with above study as it provides a comprehensive overview of different types of challenges

encountered by health workers while interacting with CHIP application. The analysis suggested that health workers have experienced application freeze and data syncing issues while interacting with CHIP application. In addition to this, nearly half of health workers have experienced battery draining issues while using CHIP application. Additionally, majority of health workers have experienced at least one type of challenges while operating CHIP application. In addition to this health workers established contact to helpline number when experienced any challenges while interacting with CHIP application.

The findings of addressing comprehensive primary healthcare in Gujarat through m health intervention and early implementation experience with TECHO+ programme (6) suggested the use of digital health application like: TECHO+. It was aimed at making progress across all dimensions of comprehensive primary healthcare services in Gujarat. The TECHO+ application focused on updating family health survey to improve data quality. The community health workers logged in to mobile applications to access their work plan. The study used a participatory process documentation approach and key informant interviews were conducted with health officials from several district of Gujarat to understand the process of rollout, implementation challenges of digital health solutions. Most of the health workers have experienced technical illiteracy while interacting with application. The issues of health workers were resolved by helpline number, WhatsApp group and established contact with supervisors. The TECHO+ application showed potential to enhance data quality and service coverage whereas the findings of our study has completely aligned with the findings of above study as the health workforce has focused on using different kinds of programs or modules under CHIP application. The health workforce has focused on completed first digital health survey then shifted to connected modules or programs under CHIP application. In initial phase the health workforce has experienced several challenges while interacting with CHIP application like: application crash issues, technical illiteracy issues due to lack of awareness among health workers for using digital health applications or tools, followed by battery draining issues. Additionally, for resolving those issues the health workers have established contact with supervisor, helpline number and co- workers.

The findings of ASHA soft programmes in India (7) suggested that the time taken for reimbursement of ASHA payment was reduced from sixty-seven days to twelve days and it leads to eliminate manual data entry error and corruption. This program was introduced with an objective to develop timely and transparent payment system for ASHA. Monitoring the performance of ASHA and this program can lead to avoid human interference as well as build friendly work relationships between ASHA and Government officials of Health department. The programme introduces a standard online procedure for payment and performance monitoring of ASHA. It leads to increase ASHA incentives by seventy-seven percent and improve their work performance by seven percent for maternal health as well as nine percent for child health within first year. The streamline reporting system increased motivation and job satisfaction due to transparent and timely payment system. This programme demonstrated the potential of digital health intervention to enhance the efficiency and transparency of community health worker management whereas the findings of our study has completely aligned with the above study as it was observed from an analysis that majority of health workers have normal practice of first data entered in paper then in an application as it can leads to reduce data entry error and enhance the effectiveness as well as efficiency of healthcare workers. ASHA and ANM was crucial part of India's public healthcare system as they bridge the gap between healthcare facilities and communities. To enhance their effectiveness CHIP application was introduced as it leads to empower community health workers, improve accountability of government officials for timely delivery of healthcare services, data driven decision making and optimum utilization of public health resources. Introduction of digital health solutions was led to reduce burden on community health worker, streamline reporting mechanism and motivate the community health worker for providing healthcare services at the last mile. The findings from our study focused on evidence-based approach for improving public health outcomes and health seeking behavior of health workers. The findings highlight the need of capacity building through training conducted at regular interval for effective and efficient healthcare service delivery in public healthcare delivery system. The CHIP application helps in monitoring the performance of community health

workers with the help of data collected under various programmes covered by the CHIP application.

The findings of ASHA worker's knowledge and service delivery in Ludhiana (8) suggested that majority of ASHA workers have good knowledge about common health problems in their areas such as malnutrition, anemia and communicable diseases. In addition to this the ASHA workers was completely aware about non- communicable disease like:- Hypertension, diabetes. Additionally, the ASHA workers were well versed with various services including: maternal and child health, family planning, immunization and health education. The ASHA workers have a good understanding of their roles and responsibilities for providing primary healthcare services to the community however there is a need to strengthen their knowledge on non-communicable disease by providing regular training and support to enhance their skills. The study highlights valuable insights into the knowledge and service delivery of ASHA workers and potential need of training for effective implementation of public health programs at the community level while the findings of our study has aligned with the above study as we know that CHIP application covers all the programmes under National health mission. There were several modules designed to generate awareness among community related to communicable and non- communicable diseases. It focusses on preventive, promotive, curative, rehabilitative and palliative care to community by real-time monitoring of health indicators. There were various programs covered under CHIP application like: Add household, Family planning, Family register, NCD, Screening and Follow up, RCH etc. The data collected under various programs was used for timely delivery of healthcare services and track the records of risk cases for different kinds of disease. The application helped in preparing work plan for providing public health services at the last mile. Most healthcare workers were using CHIP applications which suggest that CHIP application was widely accepted tool among healthcare workers for effective and efficient healthcare service delivery in public health care delivery systems. The burden on healthcare workers can be reduced by integrating with existing applications of health systems.

The findings of challenges and prospects of India's digital health journey (9) reveals that India's digital health market was expected to grow rapidly due to initiatives like:- National digital health mission, Ayushman Bharat Health Account was providing necessary digital infrastructure and framework to drive the adoption of digital health. Leveraging digital health can help India achieve universal health coverage by improving access, delivery and outcome of healthcare services. The COVID-19 pandemic has accelerated the adoption of digital health solutions, highlighting their potential to transform healthcare delivery. There were several challenges which was faced during implementation of digital health solutions was low digital illiteracy among healthcare workers, especially older frontline workers poses a significant challenge to the adoption and effective use of digital health technologies. There was a shortage of skilled workforce in health informatics, which was crucial for developing and maintaining digital health infrastructure. Due to lack of robust data governance frameworks and policies has led to concerns around patient data privacy and security. The unreliable Information Technology system or Artificial Intelligence system can undermine the efficiency and accuracy of digital health platform whereas findings of our study has clashed with the findings of above study majority of health workers have experienced several challenges like:- application crash issues, data syncing issues, battery draining issue etc. while interacting with CHIP applications. Additionally, for resolving those issues the health workers have established contact with supervisor, helpline number, Family member and co- workers. The technical illiteracy, lack of time and Increases workload act as a denial reason given by health workers for non-acceptance and usage of CHIP application. Most healthcare workers were using CHIP applications which suggest that CHIP application was widely accepted tool among healthcare workers for effective and efficient healthcare service delivery in public health care delivery systems. The burden on healthcare workers was reduced by integrating with existing health system application.

The findings of five crucial challenges in Digital Health (10) suggested that there were several challenges which were faced while implementing digital health solutions. Data security and privacy by ensuring the security and privacy of sensitive patient data was

crucial with increasing cybersecurity threats targeting healthcare organization and strict compliance of regulations like:- HIPAA, GDPR etc. Due to lack of interoperability between different healthcare system poses a significant challenge for digital health. The effective communication between system was essential to avoid inefficiencies and delay in treatment. It can lead to create burden on healthcare workers. There were various regulatory framework and guidelines for digital health technologies across countries create bottlenecks in their development. The robust and transparent regulatory framework was needed to ensure the safety, efficacy and cost effectiveness of digital health applications. Resistance to change act as a major roadblock for smooth implementation of digital health solutions it requires significant changes to workflows, training and re-skilling of healthcare providers which was crucial for improving efficiency, transparency and compliance. Integration with existing system in healthcare was essential for successful digital transformation. The findings of our study have clashed with the findings of above study as we know that the majority of health workers have encountered several challenges while operating CHIP application. The application crash issue, data syncing issue, battery draining issues, language etc was various issues which was encountered by health workers while interacting with CHIP application. The application crash issues occur due to unnecessary memory allocation in the device in which application was launched, due to non-optimizing user interface and due to usage of out of date or non-updated application. The data syncing issue occur due to inconsistent internet connectivity issue. The battery draining issues occur due to unnecessary usage of mobile features like:- Location, Bluetooth etc and avoiding use of battery saver mode while interacting with CHIP application.

Chapter 6:- Conclusion

The socio-demographic profile of health workers indicates equal distribution of health workers among tribal (Lasadia) and Non-tribal (Vallabhnagar blocks). A significant proportion of health workers were covered under age group of thirty-one to forty years. A substantial number of health workers were found to be qualified graduate or above and have work experience of more than ten years. A majority of health workers were using CHIP application themselves. Most of them received only a single training session for operating CHIP application. Most of the data entry was done by health worker after initial paper-based entry. Majority of health worker have last time used CHIP application over a month. The majority of the health workers have not used application features due to lack of awareness which indicates potential needs of further training. The majority of health workers have mentioned that RCH programme was found to be most convenient program under CHIP application.

A significant proportion of health workers have experienced application crash issues, data syncing issues followed by battery draining issues while interacting with CHIP application. Additionally, the health workers have established contact to helpline number when experienced any challenges while interacting with CHIP application.

Recommendations

A. Application crash issues:

1. Optimize user interface.
2. Avoiding unnecessary memory allocation.
3. Provide informative messages to users like:- Restart your device and update application at regular interval.

B. Battery draining issues:

1. Enable battery saver mode by default after login in an application.
2. Disable location feature once location was captured.

C. Data syncing issues:

1. Use data sync features in an area where consistent internet connectivity is available.

- D. Simplify user interface of CHIP application and provide step-by-step guidance.
- E. Integrate with existing health system application will leads to reduce burden on healthcare workers.

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Informed consent form

The purpose of this study is to gain valuable insights into the real-world experience of ASHA and ANM workers with digital health tools. This information will be used to improve the design and functionality of these applications, ultimately enhancing public health service delivery. The telephonic interview will be conducted for 20 minutes where you will be asked questions about your experience using CHIP applications in your work. All your information will be kept confidential. Your personal identifying information will not be disclosed in any reports or publications. Your participation in this study is completely voluntary and you have the right to withdraw from the study at any time.

I have read and understood this consent form and voluntarily agree to participate in this study.

Name: _____

Date: _____

Questionnaire Tool

Identify usage and challenges of CHIP application for ASHA and ANM in public healthcare delivery system.

(The assessment tool has been devised to identify gaps and evaluate the challenges encountered with the ASHA and ANM applications in the public healthcare delivery system. Comprising 23 questions, this questionnaire consists of two sections: a) user's detail b) application usage detail to the challenges faced with these applications. This tool is prepared by Khushi Baby for ANMs/ASHAs to assess CHIP applications in Udaipur, Rajasthan. The insights gathered from these responses will play a crucial role in identifying and addressing gaps, as well as refining our ongoing strategy for the ASHA and ANM applications in the public health delivery system.)

Section A: User details

1. **Designation** _____
2. **District** _____
3. **Block** _____
4. **Rural/Urban** _____
5. **Health facility** _____
6. **Age** _____
7. **Qualification.**
 - a) $\leq$ 8th pass
 - b) 10th pass
 - c) 12th pass
 - d) Graduate or more
8. **Work Experience.**
 - a) < 1year
 - b) 1-2 years
 - c) 2-5 years

- d) 5-10 years
- e) >10 years

Section B: Application usage detail

9. How many types of application you are currently using?

- a) PCTS App
- b) CHIP Application
- c) U-WIN app
- d) NCD Application
- e) FP- LMIS Application
- f) AB- HWC Application
- g) Nikshay Application

10. What is the reason of not using CHIP application (If option B is not selected in Q-9)?

- a) Technical Illiteracy
- b) Data security concerns
- c) Increases workload.
- d) Time constraints or Lack of time
- e) Lack of awareness
- f) Flexible with paperwork
- g) Not applicable

11. How long you are using CHIP application?

- a) 1 year
- b) 1-2 years
- c) 2-3 years
- d) >3years

12. Is there any training provided to you before implementing CHIP application?

- a) Yes
- b) No

13. If yes, then please specify how many numbers of training provided to you for using CHIP application?

- a) 1
- b) 2
- c) 3
- d) >3

14. What was the last time you used CHIP application?

- a) Within 7 days
- b) 15 days ago
- c) One month ago
- d) >1 month ago

15. Enumerate the name of program under CHIP application?

- a) Add household.
- b) Family Register
- c) Family Planning
- d) RCH Program
- e) NCD Program
- f) NVBDCP
- g) Other National Program [TB, Cataract, Leprosy, Malaria]
- h) Screening and follow up.

- i) Vishesh Abhiyan [MR Elimination, Covid Vaccination]
- j) Death

- k) ABHA Number
- l) Information

16. How do you enter data in the CHIP application?

- a) First on the register, then on application
- b) Directly in the application
- c) None of the above

17. Who enters data in the CHIP application?

- a) Always entered by me
- b) Mostly entered by family member
- c) Sometimes entered by me and by family members

18. Which module is more convenient to use under CHIP application?

- a) Add Household
- b) Family Register
- c) Family Planning
- d) RCH Program
- e) NCD Program
- f) NVBDCP
- g) Other National Program [TB, Cataract, Leprosy, Malaria]
- h) Screening and follow up.
- i) Vishesh Abhiyan [MR Elimination, Covid Vaccination]
- j) Death
- k) ABHA Number
- l) Information

19. How frequently do you watch app tutorial videos?

- a) Once in a week
- b) Fortnightly
- c) Once in a month
- d) More than a month
- e) Never

20. Do you face any of these challenges while operating CHIP application?

- a) App crashes or freezes
- b) Data syncing problem
- c) Internet connectivity issues
- d) Battery drain
- e) Complex user interface
- f) Language barriers
- g) Lack of training
- h) None of the above

21. Whom do you contact when facing any problem while operating CHIP application?

- a) Supervisor
- b) Helpline number
- c) Family member
- d) Coworker
- e) Stop using application

22. Which features do you use while operating an application?

- a) OCR Scanner
- b) Aadhar Scan QR
- c) Both
- d) None of the above

**23. Are you able to supervise or visualize the data entered by ASHA
(Applicable for ANM only)?**

- a) Yes
- b) No